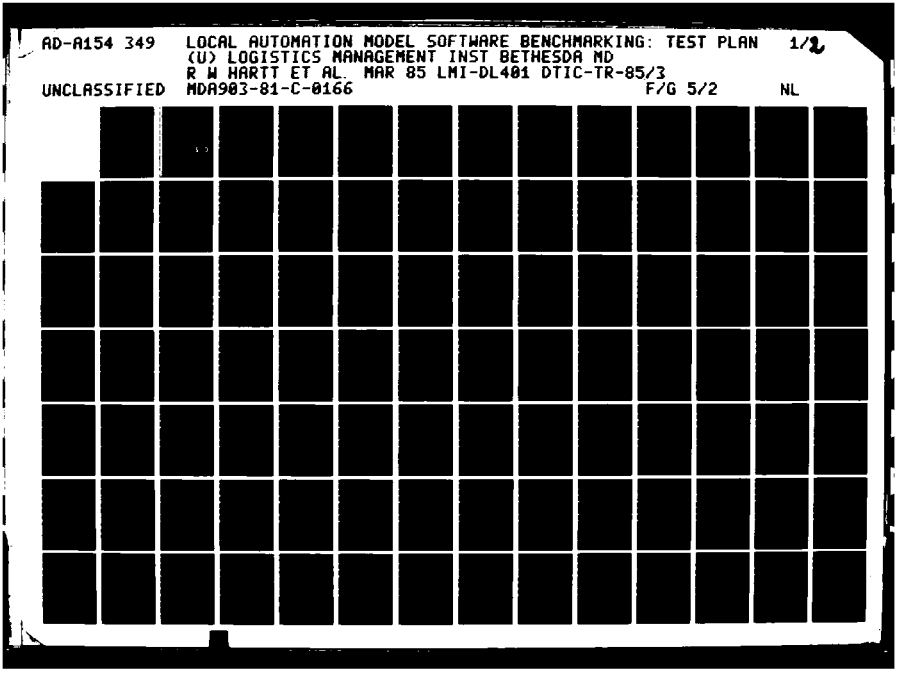
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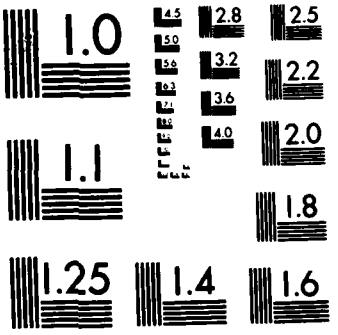

LOCAL AUTOMATION MODEL SOFTWARE BENCHMARKING: TEST PLAN

March 1985

Richard W. Hartt
Dennis J. O'Connor

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Sponsored by the Defense Technical Information Center (DTIC), the Local Automation Model (LAM) project encompasses requirements determination, system design, prototype system implementation, and production system acquisition for a fully resident integrated library system. The system is designed and will be made available for installation at Federal technical libraries and information centers. With the system, libraries will be able to share cataloging of technical reports with DTIC, relying on machine-aided translation of citations and an intelligent gateway to facilitate data transfer. The intelligent gateway also

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permits simultaneous searching of multiple, heterogeneous data bases, both Government-operated and commercial. In addition, the system supports full local collection management -- retrieval, cataloging, and circulation management and control. The prototype and production systems will be implemented with commercially available library automation software. The Test Plan is the fifth in a series of life-cycle documentation for the system. It contains criteria -- both performance and functional -- for selecting from among several packages recommended for benchmarking. Using the Test Plan, test participants will exercise features in each of the six packages selected for benchmarking and score the package on how well each feature is performed. The Test Plan contains a description of the testing procedures, recommends organizational responsibilities for benchmarking, and lists over 350 evaluation criteria derived from system requirements and a survey of library software capabilities and features. Score sheets for use by test participants are included in eight appendices to the report.

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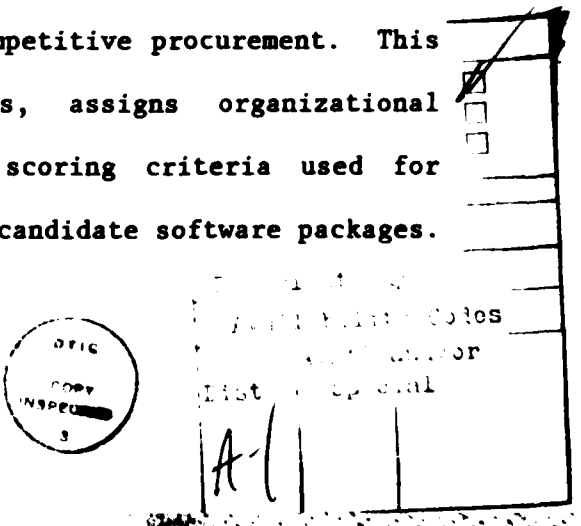
PREFACE

The Test Plan is the fifth in a series of system development documents published on the Local Automation Model project. To date, we have defined the system requirements, developed a conceptual design, established functional and performance specifications, surveyed existing library automation software products, and recommended six of these packages for comparison.

Available for implementation by Department of Defense (DoD) technical libraries, the system will integrate local collection management functions -- retrieval, cataloging, and circulation management and control -- with system features required to support resource sharing. Resource sharing includes shared cataloging by individual technical libraries into the Technical Reports data base, a central repository for bibliographic citations to over 1.5 million technical reports prepared by and for the DoD. Resource sharing also encompasses access to external bibliographic resources -- both Government and commercial -- using a single system and command language for information retrieval. A prototype of the system is planned for implementation at the Defense Nuclear Agency during fiscal year 1985 to demonstrate the concept as well as provide an evaluation period prior to acquiring production systems.

Both the prototype and production systems will be implemented using commercially available software for local collection management. The production system software will be acquired through competitive procurement. This Test Plan describes the benchmark procedures, assigns organizational responsibility, and lists the evaluation and scoring criteria used for selecting the prototype system from among the six candidate software packages.



SECTION 1. GENERAL

1.1 Purpose.

This Test Plan for the Local Automation Model (LAM) is written to:

- Provide a description of the overall concept for conducting software benchmarking;
- Describe the procedures for Phase I benchmarking of selected software packages;
- Establish a comprehensive test plan and communicate to the test participants the nature and extent of the tests deemed necessary to provide a basis for evaluating and selecting software for prototype system implementation;
- Coordinate with test participants a schedule of events, a specification of equipment and organizational requirements, and the methods for testing; and
- Provide a written record of the evaluation criteria used for assessing software package performance and selecting a package for prototype system implementation.

This Test Plan describes the overall approach for benchmarking (Section 2) and addresses the procedures, evaluation criteria, and schedule for Phase I benchmarking (Sections 3 and 4). As used throughout this document, the term benchmarking refers to a software testing and evaluation process consisting of (1) an assessment of the functional completeness of a software package (i.e., does the package perform the functions required for system implementation) and (2) an assessment of the relative performance of six candidate software packages.

Phase I of the benchmark covers the installation and evaluation of selected software packages independent of other software required for prototype system implementation. Phase II encompasses integration of the software packages with the intelligent gateway software. This intelligent gateway software, developed by Lawrence Livermore National Laboratory (LLNL),

is important to meet the LAM requirement to communicate with the Defense Technical Information Center (DTIC) data bases. Phase III covers an assessment of the performance of the software packages integrated with the intelligent gateway software. Phase III test procedures and evaluation criteria will be published separately.

1.2 Project References.

The LAM encompasses a system design, development, and evaluation project sponsored by the DTIC located at Cameron Station in Alexandria, Virginia. The requirements for and design of the system are documented in:

- Local Automation Model: Conceptual Design Document, Logistics Management Institute, April 1983;
- Local Automation Model: Functional Description, Logistics Management Institute, October 1983;
- Local Automation Model: System Specification, Logistics Management Institute, February 1984; and
- Local Automation Model: Assessment of Library Software Availability, Logistics Management Institute, September 1984.

The prototype system -- planned for implementation at the Defense Nuclear Agency (DNA) in Alexandria, Virginia -- will provide the opportunity to demonstrate and evaluate an automated library system with special features for bibliographic information sharing. The system will support conventional collection-handling capabilities such as original cataloging and citation retrieval. In addition, the system will facilitate information sharing between Department of Defense (DoD) technical libraries and DTIC by incorporating intelligent gateway processing capabilities.

Gateway capabilities required for the system include: (1) automatic searching of both the local technical library catalog and the DTIC Technical Reports (TR) data base using a single search language and format, (2) downloading of information from the TR data base to the local system, and

(3) machine-aided translation of locally created catalog citations into a format acceptable for entry in the TR data base. Thus, with one system and one set of commands, a technical library can: (1) maintain and expand a catalog tailored to local needs, (2) access the wealth of information contained in the TR data base, and (3) contribute directly to the timely dissemination of scientific and technical information via direct cataloging in the TR data base.

The system is intended for implementation by technical libraries participating in the Shared Bibliographic Input Network (SBIN) sponsored by DTIC. (SBIN was established initially as an experiment in shared cataloging and has since been established as an on-going DTIC program.) At present, in addition to providing inputs to a local catalog, SBIN member libraries catalog in the TR data base using a separate input system supported by the Defense RDT&E On-Line System (DROLS). This procedure results in a duplication of manual and intellectual effort and serves as a disincentive for participating in shared cataloging. In large part, initiation of and requirements for the LAM project reflect the need to reduce the burden of effort placed on SBIN members and thereby promote information sharing.

Included in the LAM project is the development of an acquisition strategy and plan for a production system. Experience gained through operation and evaluation of the prototype system will contribute directly to development of the acquisition plan. Since publication of the Functional Description and System Specification, libraries and information centers outside of SBIN have expressed interest in implementing the system. On the basis of this interest, DTIC will make the production system available to other DoD libraries.

The prototype and production systems will be implemented using commercially available library software. The gateway features available in the

prototype system will be provided through adaptation of a subset of the Integrated Information System (IIS) developed by the Technology Information System (TIS) group located at LLNL. Commercial software for the prototype system will be selected through benchmarking as documented in this Test Plan. Competitive bids will be solicited for acquisition of the production system.

1.3 Terms and Abbreviations.

The following terms, acronyms, and abbreviations are used in this document:

- ASCII: American Standard Code for Information Interchange;
- ATLAS: Automated Technical Library Accession System -- the automated catalog of technical report bibliographic citations currently maintained by the Defense Nuclear Agency;
- DNA: Defense Nuclear Agency;
- DoD: Department of Defense;
- DROLS: Defense RDT&E On-Line System;
- DTIC: Defense Technical Information Center;
- IIS: Integrated Information System -- an intelligent gateway developed and supported exclusively by the Technology Information System group at Lawrence Livermore National Laboratory;
- LAM: Local Automation Model -- a project sponsored by the Defense Technical Information Center for demonstrating, evaluating, and acquiring an integrated library system encompassing local collection, management, and access to external bibliographic resources;
- LLNL: Lawrence Livermore National Laboratory -- a Department of Energy-funded, contractor-operated research and development laboratory located in Livermore, California;
- RDT&E: Research, Development, Test, and Evaluation;
- SBIN: Shared Bibliographic Input Network;
- TIS: Technology Information System -- used to describe both the work on advanced information-handling technology and the organizational element (group) performing this work at LLNL; and
- TR data base: The Technical Reports data base operated and maintained by DTIC containing more than 1 million citations to reports published or sponsored by DoD.

SECTION 2. BENCHMARKING PLAN

2.1 Introduction.

The applications software for the LAM consists of two major components: (1) a commercial library software package supporting local collection cataloging, retrieval, and circulation management and control and (2) an intelligent gateway providing access to the DTIC TR data base for cataloging and retrieval. The gateway also provides postprocessing capabilities such as transferring TR data base citations to the local system, translating and merging citations from both sources into a common format, eliminating duplicate or unwanted citations, citation sorting, and reordering citation contents (data fields).

The commercial library software package used for prototype system implementation will be selected through benchmarking. Benchmarking will be conducted in three phases. Phase I benchmarking -- the subject of this Test Plan -- consists of independent testing and evaluation of six candidate software packages. Its objective is to confirm the capabilities of each package for providing the functions required for local collection management.

Phase II of the benchmark involves assessing the technical implications and feasibility of integrating the software packages with intelligent gateway software. Each package satisfactorily completing Phase I benchmarking will be subjected to this assessment. Where feasible, the packages will be integrated with the gateway software. Requirements for integrating gateway software with the commercial packages will be specified in Local Automation Model: Program Specification for Cataloging and Retrieval User Access published by the Logistics Management Institute (LMI). That document will describe the

requirements and specifications for facilitating user access to the integrated system.

Phase III of the benchmarking consists of evaluating system performance of the integrated software components; *i.e.*, the commercial packages linked with the intelligent gateway through a user interface. The objective of Phase III is selection of an integrated package for prototype system implementation. A secondary goal of Phase III is testing and refinement of the user interface for accessing the system.

2.2 Pretest Activity.

The following activities must be completed in preparation for benchmarking: (1) selection, acquisition, and installation of the candidate packages and (2) test catalog (data base) development. Each pretest activity is discussed in this subsection.

Assessment of Library Software Availability. A survey was conducted to assess the availability of commercial library software packages for performance benchmarking and to select packages for testing. The following six packages, marketed by the companies indicated, were selected:

- BIBLIOTECH -- Comstow Information Service;
- BRS/SEARCH -- Bibliographic Retrieval Service;
- DATALIB -- M/A-COM Sigma Data, Inc.;
- LS/2000 -- OCLC, Inc.;
- MINISIS -- Systemhouse, Inc.; and
- ULISYS -- Universal Library Systems.

A subset of the IIS will be used to provide the gateway processing capabilities required for the system. The IIS is unique in that it offers the broad range of postprocessing and computer-to-computer data transfer features essential for LAM operations.

Software Acquisition and Installation. The TIS group at LLNL will arrange for temporary use of each of the software packages selected for benchmarking. First preference will be to install each package locally at LLNL. Alternatively, access to the packages via dial-up telephone lines and terminals is acceptable for testing. All test participants (see Section 2.4.4) must have access to the packages.

Test Catalog Development. A catalog of technical report citations will be prepared for use during benchmarking. The catalog will be composed of unclassified, publicly releasable citations derived from the DTIC TR data base and the DNA Automated Technical Library Accession System (ATLAS) file. Five hundred citations will be extracted from each source, written on magnetic tape, and transferred to LLNL. LLNL will load the catalog for packages installed at the Laboratory and will provide copies, with accompanying disclosure limitation restrictions, to those vendors offering telephone access to software packages.

2.3 Testing Schedule.

Testing will take place at four locations: LLNL, DNA, DTIC, and LMI. Test participants at those locations will use dial-up telephone access to a computer either located at LLNL (for packages installed there) or provided by a vendor (for packages not installed at LLNL). Benchmarking will take place from November 1984 through April 1985. Included in the initial stages of this schedule is the development of a representative test catalog and the installation of vendor-supplied software packages.

2.4 Phase I -- Commercial Package Testing.

Phase I benchmarking will consist of a comparison of the six software packages selected during the software availability assessment. Each package will be exercised to determine whether it offers the functions and features

specified for the LAM system. In addition, test participants will be asked to rank the six packages on a function-by-function basis so that one package can be selected for prototype system implementation. Members of the DNA technical library staff will participate in this phase of the benchmarking and will be responsible for exercising each software package as outlined in Section 4 of this Test Plan. Staff members from the LLNL TIS group will operate the systems subjected to benchmarking on LLNL computers and, in conjunction with DTIC staff members participating in the test, will assess the technical performance and suitability. Staff members from LMI will coordinate the testing, compile the test results, and prepare a Test Analysis Report documenting those results.

2.4.1 Milestone Chart.

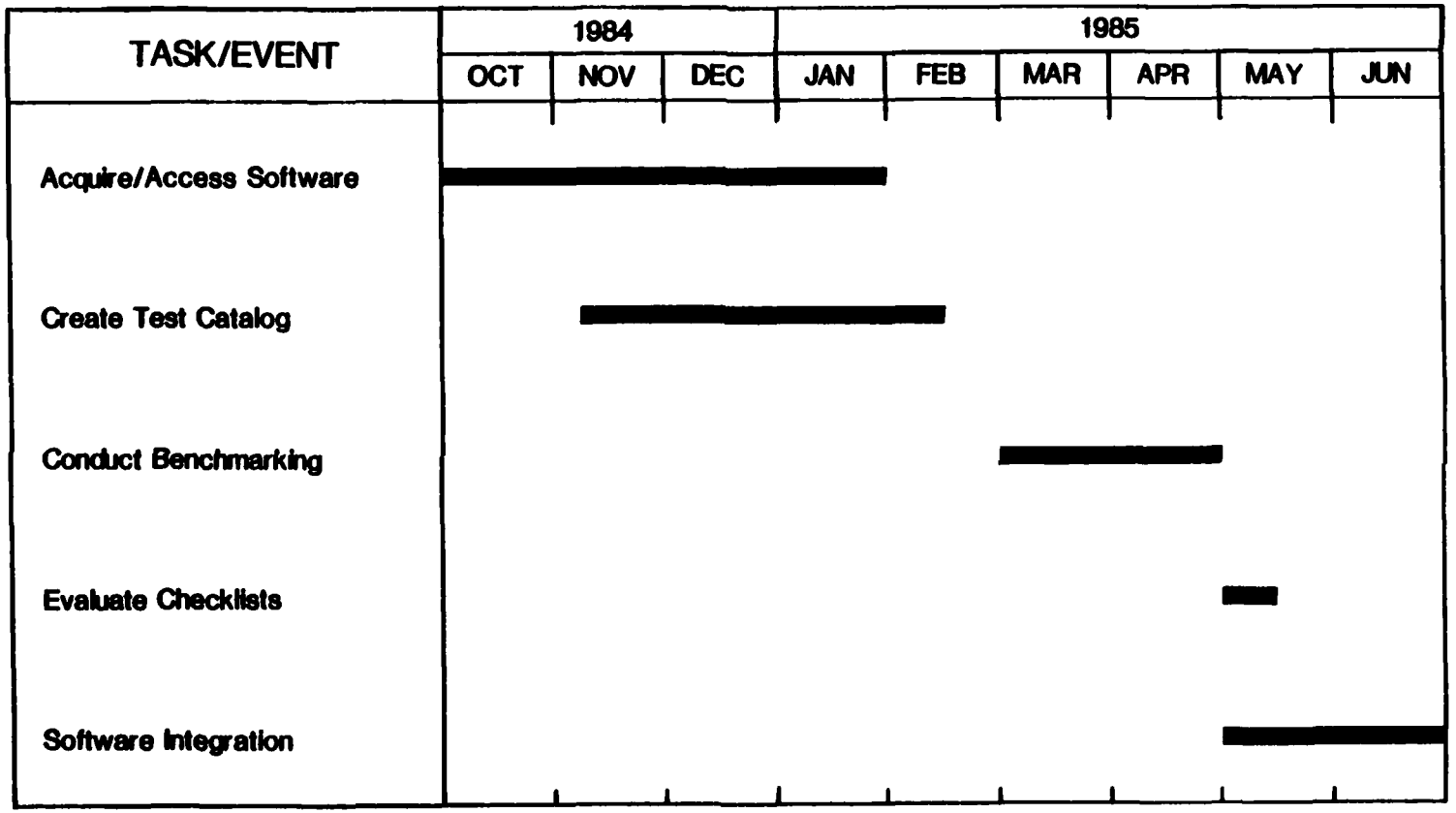
Figure 2-1 depicts the schedule for Phase I benchmarking.

2.4.2 Equipment Requirements.

Test participants are responsible for providing the equipment needed for dial-up access to vendor-provided software packages. Section 2.4.6.2, "Site-Supplied Materials," presents a description of equipment requirements. Test participants must also request access rights to the computers used for benchmarking. For vendor-provided computers, access will be coordinated through LLNL; for access to the LLNL computer and vendor-provided computers used for benchmarking, requests should be sent to Dr. Hilary Burton, the project leader at LLNL.

Vendors providing dial-up access to software packages for benchmarking will generally permit access for a specified period of time. Schedules established by these vendors will be coordinated by LLNL and will be distributed to test participants as supplements to the Test Plan prior to commencement of benchmarking.

FIGURE 2-1. DL401 TEST PLAN



For packages installed at LLNL, the Laboratory generally allows dial-up access to their computer system any time of the day. If LLNL sets aside specific blocks of time for LAM benchmarking (to reduce contention for resources and improve system responsiveness), test participants will be notified by supplements to the Test Plan.

2.4.3 Software.

Vendors are encouraged to provide software for implementation at LLNL. Packages provided by vendors must be compatible with the operating environment supported by existing Laboratory computers available for benchmarking. If a compatible machine is not available at LLNL, vendors may provide dial-up access to a computer running their package. Access to packages by test participants must be available throughout the period of time scheduled for Phase I benchmarking. LLNL is responsible for acquiring access rights to vendor software. Should problems arise in obtaining vendor participation or access to software for benchmarking purposes, the project monitor at DTIC will be notified and alternative courses of action recommended.

2.4.4 Personnel.

The DNA will be responsible for providing at least two technical library staff members to be test participants. The DNA is encouraged to assign additional staff members to obtain broader participation by potential system users.

Staff members from DTIC will provide assessments of software performance, functionality, and technical suitability for implementing the prototype system.

Test participants may perform their evaluations independently of other participants, consistent with existing assignments and job responsibilities. However, a test participant must complete a full evaluation of all packages so

that a valid relative performance ranking can be obtained. That is, if a test participant evaluates cataloging functions and features (as described in Section 4), then those functions and features must be evaluated in every package subjected to benchmarking.

The results of each participant's evaluation will be a relative ranking of all systems benchmarked reflecting the relative performance, completeness, and ease of use demonstrated by each package.

Staff members from LLNL will operate the systems installed at the Laboratory and will coordinate with all vendors concerning access to software, equations on the operation of packages, and test catalog development. LLNL staff members will provide technical assessments of package performance, ease of operation, and overall suitability for prototype system implementation. Particular consideration will be given to assessing the feasibility of integrating IIS software with the commercial packages selected for benchmarking.

Staff members from LMI will be responsible for compiling results and preparing a Test Analysis Report summarizing the results. LMI staff members will also evaluate selected features. Benchmark results will be coordinated with DNA technical library staff members, DTIC test participants, and project members from LLNL.

Recommendations covering organizational responsibilities for testing each of the system functions included in the benchmark are discussed in Section 4.1, "Test Description."

2.4.5 Orientation Plan.

The LAM project leader for LLNL will provide test participants with short instruction sheets explaining how to use each package subjected to benchmarking. Specific questions on the operation of a package should be directed to the LLNL project leader who will serve as the central point of contact with the participating software vendors.

2.4.6 Test Materials.

Each test participant will receive a copy of this Test Plan. The description and evaluation factors specified in Section 4 and Appendices A through H are required for conducting the comparative tests selected for the LAM benchmark. This Test Plan will be supplemented as required to assist test participants in conducting the benchmarking. The passwords and user identification codes required to access the computers on which the six software packages will be operated will be provided to all test participants in a separate memorandum. The passwords and access codes must be safeguarded to prevent unauthorized use of the software. Schedules of software and computer availability will also be provided as software installation progresses.

2.4.6.1 Deliverable Materials.

For each package made available for benchmarking, supporting documentation such as user's manuals and operations guides will be requested from the vendor. If made available for installation at LLNL, the vendor must supply program tapes and sufficient documentation to permit program loading and execution. Vendor-provided operations guides must provide sufficient detail to permit development of operating instructions for test participants as called for in Section 2.4.5, "Orientation Plan."

2.4.6.2 Site-Supplied Materials.

Test participants are required to provide their own terminal with screen and keyboard, modem, and local telephone line connection. Terminals used for the benchmarking should, as a minimum, be capable of receiving and transmitting the full American Standard Code for Information Interchange (ASCII) character set. The screen used should provide a full 80-columns by 24-lines

display. It is recommended that the modem and teleprocessing features of the terminal provide the following features:

- 1200-baud data transmission rates;
- full duplex;
- asynchronous communications; and
- parity checking (odd or even parity).

Test participants will connect to either the host computer used at LLNL for benchmarking or the host computer designated by the vendor for those packages not installed at LLNL.

At the conclusion of benchmarking, participants must submit a written evaluation of the packages using the checklists provided in the Test Plan (Appendices A through H). These evaluations will be compiled by LMI for use in selecting a package for prototype implementation.

2.4.7 Security and Privacy.

Test catalogs extracted from the DTIC TR data base and the DNA ATLAS file will consist of citations that are unclassified with unlimited and unrestricted distribution. However, catalogs created at vendor sites from these extracts must be safeguarded through a nondisclosure agreement with the vendor. No data subject to Privacy Act restrictions will be used: test patron data (if required) can be fictitious. Once implemented at an operational site for testing, the catalogs and patron file will be subject to protection and access limitations consistent with the level of classification of the citations present in the catalog. WARNING: During benchmarking, participants may be required to enter bibliographic data to test cataloging features. Do not enter classified data in any of the benchmark systems. Limit all cataloging entries to unclassified, unlimited distribution citations only.

2.5 Phase II and III.

Gateway Integration. Phase II benchmarking encompasses integration of the intelligent gateway software with the commercial package selected during Phase I testing. Phase III provides the opportunity to test and refine the integration of the two software components prior to prototype system implementation at the DNA.

User Interface Implementation and Refinement. To meet the objectives of the system design, users must have access to the system functions through a common set of commands and formats. Prior to prototype system implementation, a user command language and format will be installed and refined in response to user requirements. Initial requirements for the user interface will be described in a Program Specification.

SECTION 3. TEST SPECIFICATION AND EVALUATION

3.1 Test Specification.

3.1.1 Requirements.

Functions and processes required for the LAM system have been documented in the Functional Description and System Specification. These requirements are reflected in the benchmarking checklists contained in Appendices A through H of this Test Plan. The benchmarking checklists serve as score sheets and are distributed to test participants as part of the Test Plan. Use of the checklists and score sheet is described in Section 4 of this Test Plan. Separate benchmarking checklists are provided for each major system function:

- Reference -- Appendix A;
- Cataloging -- Appendix B;
- Circulation Management and Control -- Appendix C;
- Reports and Other Printed Output -- Appendix D;
- Security and Access Control -- Appendix E;
- Reliability and Maintainability -- Appendix F;
- Ease of Use and Modification -- Appendix G; and
- Hardware and Software Features -- Appendix H.

3.1.2 System Functions.

Phase I benchmarking will focus on verifying the availability of functions supporting cataloging, retrieval, and circulation management and control. The scope of Phase I benchmarking is limited to assessments of commercial software packages operated independently of intelligent gateway software. For this reason, benchmarking will be confined to cataloging into a local catalog and retrieving cataloged citations from a local catalog.

Collection management features supporting circulation management and control will also be benchmarked. A detailed discussion of benchmarking procedures and a listing of features to be covered are contained in Section 4 and Appendices A through H, respectively.

There are over 350 features included for evaluation in the Test Plan. While some of these features may not appear essential for prototype system implementation, they have all been included to make the benchmarking as comprehensive and complete as possible. To aid test participants in identifying essential or critical features, the benchmarking checklists included in Appendices A through H have been annotated with " * " in the left-hand margin for these features.

Some features marked with an " * " may appear different from or contradict features not marked as critical. This apparent contradiction occurs because checklists allow for differences in implementation methods among software packages. Where alternative implementation methods are most likely to be used to meet requirements for critical features, the alternative methods are listed for evaluation. By doing this, the evaluation can be more comprehensive and may differentiate a superior product from among the candidate systems.

3.1.3 Test/Function Relationships.

The test elements for each function subject to evaluation are listed in the appendices. Section 4 presents a description of the benchmarking checklists contained in the appendices.

3.2 Test Methods and Constraints.

3.2.1 System Test Conditions.

Each package will be benchmarked using dial-up terminal access to a computer running the package. A test catalog of approximately 1,000 records

(see Section 4.2.2, "Test Data," for a description of the test catalog) will be used to evaluate retrieval functions. When evaluating cataloging functions, test participants will create citations that will be added to this catalog by the update features offered by the tested package. Test participants are again cautioned not to create classified or limited distribution citations during the test. Inputs used by test participants for retrieval and cataloging of citations will be those specified for the package being tested.

3.2.2 Extent of System Test.

Each of the six packages listed in Section 2.2, "Pretest Activity," will be evaluated for the availability and relative performance of those functions and features related to cataloging, retrieval, and circulation management and control. These functions encompass the full set of capabilities specified for the prototype system. Section 4 and the appendices delineate the specific functions and features included in the evaluation.

3.2.3 Data Recording.

Test participants are required to use the checklists and score sheets included as part of this Test Plan. One complete set of benchmarking checklists must be completed for each package subjected to benchmarking. Test participants may make additional copies of the benchmarking checklists contained in the appendices for the purpose of conducting the evaluations prescribed in this Test Plan. Test participants are strongly encouraged to make additional written notes and observations using separate sheets if room on the checklists is not sufficient. An explanation on how to use the checklists is included in Section 4.

3.2.4 System Test Constraints.

Dial-up Access. Some packages may make use of special features that use cursor control commands unique to a particular type of remote terminal. Many

of these features may be unavailable for evaluation because test participants will be using dial-up, asynchronous access methods.

Availability of Features. In some cases, the packages being benchmarked may not offer a feature listed on the checklist. In addition, some features may be available in a package but not be available for evaluation because of lack of direct access to the applications software or computer operating system. If test participants encounter circumstances in which these conditions exist, they should note the feature and the circumstances on the checklist. Periodically -- probably biweekly -- throughout the benchmarking period, test participants will be contacted to discuss any problems arising during the benchmarking. When contacted, they should indicate the features that they are unable to evaluate and provide a brief explanation of why those features cannot be evaluated.

Test Catalog. The test catalog implemented for benchmarking will contain approximately 1,000 citations. This catalog is small compared with the expected size of a typical technical library catalog. As a result, retrieval times experienced during the benchmark may not be representative of actual system operations.

Multiple Users. Over the entire time of the benchmark, it may be difficult to simulate the number of simultaneous users expected on the prototype system. Thus, better system response times may be noted during benchmarking than would be expected with an operational system supporting several users simultaneously.

Schedule. The software packages provided on vendor computers will be available for testing during periods specified by the vendor. The schedules established by each vendor will be announced to test participants through supplemental notices published as the pretest system implementation progresses.

3.3 Test Progression.

Test participants may elect to evaluate system functions in any order. However, the benchmarking checklists list processing steps and features by function in the sequence or order in which they would be executed during normal operations. Therefore, test participants are strongly encouraged to move through the sequence of test steps within a function as listed on the accompanying checklists (see Appendices A through H).

3.4 Test Evaluation.

3.4.1 Test Data Criteria.

Results will be evaluated using the relative performance scores assigned to each group of processes or functions by the test participants. These relative rankings will be combined to form an overall ranking for each system. In general, ranking preference will be given to systems offering the full list of features and capabilities specified as LAM system requirements. Additional weighting will be given to features established as critical for system implementation. Since each vendor may choose to implement those features and capabilities differently, a premium will be placed on user reaction to the systems as reflected in the relative rankings provided by test participants.

3.4.2 Test Data Reduction.

Test participants must record their evaluation of system features using the checklists provided with the Test Plan. Data on the checklists will be combined to form an overall ranking for the systems. System rankings developed by individual test participants will count equally among all participants when combined to form an overall ranking. The overall rankings will not reflect weighting of one function over another. In the event of ties or ambiguities in the ranking results, a structured walk-through of the test sequence may be repeated using the packages in question. Selected test

participants will be asked to attend this walk-through and assist in developing a second assessment and ranking of system features and capabilities.

SECTION 4. PHASE I TEST DESCRIPTION

4.1 Test Description.

In the Phase I benchmarking, the test participants will prepare and submit evaluations of the six software packages chosen for benchmarking. These evaluations will be used to determine which of the packages are best suited for use in the LAM prototype system. The checklists in Appendices A through H will be used by the test participants for this purpose. Each of the eight checklists encompasses either a library function, such as "Reference" (Appendix A), or a hardware/software function, such as "Reliability/ Maintainability" (Appendix F). While some duplication does exist among the checklists, they are self-contained and can be used independently of each other. The checklists, contained in the appendices of this Test Plan, cover the following functions and operating features:

- Reference -- Appendix A;
- Cataloging -- Appendix B;
- Circulation Management and Control -- Appendix C;
- Reports and Other Printed Output -- Appendix D;
- Security and Access Control -- Appendix E;
- Reliability and Maintainability -- Appendix F;
- Ease of Use and Modification -- Appendix G; and
- Hardware and Software Features -- Appendix H.

Each checklist is comprised of software features grouped into categories. Thus, a three-tiered hierarchy has been created: functions comprised of categories comprised of features. The packages will be tested by feature; that is, test participants will conduct the test by determining whether each

package offers the features on the checklist. Examples of the features are: "System provides on-line updating of catalog," "System provides global search and replace," and "System provides record locking for update."

The features on the checklist have been constructed to be answered in a "yes/no" format with scoring levels designed to differentiate among the performance levels of the six packages tested. This format is easy to use and minimizes differences in judgment among the test participants.

Because some software packages may offer features in a slightly different form than required in the LAM or in a form that the test participants may find difficult to use, a five-point scoring has been used. This scoring system will allow test participants to indicate not only that a feature is or is not available but also that a feature is available with limitations. The scale to be used by test participants in rating each feature is as follows:

- 1 -- No, the packages does not offer the feature;
- 2 -- Yes, the package offers the feature but with severe limitations;
- 3 -- Yes, the package offers the feature with moderate limitations;
- 4 -- Yes, the package offers the feature with minor limitations; and
- 5 -- Yes, the package offers the feature without limitations.

To complete the benchmarking checklist, a test participant exercises the features listed for the package being evaluated, checks the appropriate score column (1, 2, 3, 4, or 5), and adds any comments in the column specified on the checklist. Separate sets of checklists must be filled out for each system tested. Test participants are authorized to duplicate the checklists contained in the appendices for use during the evaluation.

To utilize the particular expertise of the various test participants and to minimize the time required by any participant, we recommend that

primary responsibility for completing the checklists be assigned as follows:

- Defense Nuclear Agency (DNA):
  - -- Appendix A -- Reference,
  - -- Appendix B -- Cataloging,
  - -- Appendix C -- Circulation Management and Control, and
  - -- Appendix D -- Reports and Other Printed Output;
- Lawrence Livermore National Laboratory (LLNL):
  - -- Appendix E -- Security and Access Control,
  - -- Appendix F -- Reliability and Maintainability, and
  - -- Appendix H -- Hardware and Software Features;
- Shared Responsibility (DNA and LLNL):
  - -- Appendix G -- Ease of Use and Modification.

Staff members from DTIC will also complete checklists for Reference (Appendix A), Cataloging (Appendix B), and Reports and Other Printed Output (Appendix D).

While responsibilities for completing each of the benchmarking checklists are assigned to specific test participants, all participants are invited to prepare and submit evaluations on any of the eight functions.

4.2 Test Control.

4.2.1 System Test Means of Control.

The test participants will initiate and run all tests at a time of their choosing. Neither the initiation nor the pace of the benchmarking is predetermined. Control of the benchmarking is maintained by the individual test participant. An exception to this may arise for software running on systems not resident at LLNL. For that software, the participants will need to conduct evaluations during the operational hours of the host system. Specific

schedules for using those systems will be provided to test participants as supplemental instructions to the Test Plan. Participants must complete their evaluations by the benchmarking termination date shown in Figure 2-1, "Milestone Chart for Phase I Benchmarking."

4.2.2 Test Data.

The data to be used in this benchmark consist of 500 records extracted from the DROLS and 500 records extracted from the DNA ATLAS file. All records are unclassified and unrestricted. Appendix I contains a description of the citation format extracted from DROLS. Similarly, Appendix J contains a brief description of the citation format for the DNA ATLAS extract.

4.3 Test Procedures.

This section provides the recommended procedures for conducting the benchmarking.

4.3.1 Test Setup.

LLNL is responsible for loading the six software packages to be benchmarked and assuring that they are available via dial-up terminals to the other test participants. LLNL is also responsible for preparing material that summarizes the commands for operating each package and for distributing that material to each of the test participants listed in Section 2.4.4, "Personnel."

When the test participants receive their material, they are encouraged to log-on to each system and gain some familiarity with the six packages before beginning the formal evaluation. They are especially encouraged to learn to use the "Help" feature of each package to enable them to work out their own difficulties during the evaluation.

4.3.2 Test Initialization.

Each test is initialized by logging-on to the system running the package to be evaluated, using the material provided by LLNL.

4.3.3 Test Steps.

To perform the tests, a participant should first choose the function to be evaluated. Test participants are encouraged to read through each benchmarking checklist completely before performing any evaluations. Furthermore, we recommend that participants complete the evaluation of a function for all six packages before evaluating any other functions. This procedure will enable test participants to make assessments on the relative performance of each package in determining scores for each feature.

While the benchmarking procedures do not require participants to comment on the performance of the packages (beyond assigning a numerical score), comments will be useful in cases in which numerical scores do not provide sufficient differentiation among the systems.

After choosing the function to be evaluated, the participants should evaluate each of the packages for that function. This evaluation involves rating the package for all the features on the checklist using the five-point scale shown in Section 4.1, "Test Description." As stated previously, while the participants are required only to assign a numerical score for each feature, they are encouraged to provide written comments whenever possible to assist in the overall evaluation.

4.3.4 Test Termination.

The evaluation is complete when the participants have rated each feature of each package for the functions within their area of responsibility (see Section 4.1, "Test Description," for recommended assignments). When the checklists are complete, they should be sent to the Logistics Management Institute, 6400 Goldsboro Road, Bethesda, Maryland 20817-5886, Attention: DL501 Project Leader.

APPENDIX A

BENCHMARKING CHECKLIST: REFERENCE

This appendix contains the benchmarking checklist for the "Reference" function and features. One set of checklists must be completed for each different system tested. Check only one score per feature. Indicate your score by placing a mark in the column corresponding to the score you feel most accurately describes the feature. Use the following scoring scale and corresponding criteria:

1 - No, the package does not offer the feature
2 - Yes, the package offers the feature but with severe limitations
3 - Yes, the package offers the feature with moderate limitations
4 - Yes, the package offers the feature with minor limitations
5 - Yes, the package offers the feature without limitations

Please make any additional comments in the space provided on the checklist. If there is not enough room for your comments, please use the reverse side of the checklist or attach a separate sheet of paper with the comments. Make clear reference to the function and feature you are commenting on by using the same numbering system or title used on the checklist.

As you perform your evaluations, pay particular attention to the features marked with " * " in the left-hand margin. These features are considered critical to the implementation of the system and deserve special attention during benchmarking.

Additional copies of this appendix may be reproduced locally or may be obtained from the Logistics Management Institute, Attention: DL501 Project Leader, 6400 Goldsboro Road, Bethesda, MD 20817-5886. Completed checklists should be mailed to this address also.

BENCHMARKING CHECKLIST: REFERENCE

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
1.	Search Formulation						
	a. System permits search expressions and formulation to be tested prior to full-scale use	___	___	___	___	___	
	b. System permits nesting of search expression bodies (e.g., nesting of search arguments with parentheses)	___	___	___	___	___	
*	c. System supports a variety of search arguments:						
	- search of multiple fields with single keyword	___	___	___	___	___	
	- keywords derived from authority lists or controlled vocabularies contained on the system	___	___	___	___	___	
	- data aggregates (phrases)	___	___	___	___	___	
	- complete names, titles, etc.	___	___	___	___	___	
	d. System permits use of explicit logical (Boolean) operators:						
*	- AND	___	___	___	___	___	
*	- OR	___	___	___	___	___	
	- XOR	___	___	___	___	___	
*	- NOT	___	___	___	___	___	

BENCHMARKING CHECKLIST: REFERENCE (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	- Other _____	___	___	___	___	___	
*	e. System permits Boolean searches consistent with levels used by DROLS	___	___	___	___	___	
*	f. System permits use of relational operators:						
	- less than	___	___	___	___	___	
	- greater than	___	___	___	___	___	
	- equal to	___	___	___	___	___	
	- less than or equal to	___	___	___	___	___	
	- greater than or equal to	___	___	___	___	___	
	- not equal to	___	___	___	___	___	
	- multiple relational operators to specify ranges (e.g., between, above and below)	___	___	___	___	___	
	g. System supports use of syntactic roles in search expressions (to specify word order in phrases of search arguments)	___	___	___	___	___	
	h. System supports implicit (automatic) truncation (stemming, or partial string entry)	___	___	___	___	___	

BENCHMARKING CHECKLIST: REFERENCE (CONTINUED)

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
i. System supports explicit truncation (use of special symbol inserted by user):						
- infix	___	___	___	___	___	
- prefix	___	___	___	___	___	
- suffix	___	___	___	___	___	
- combinations	___	___	___	___	___	
- fixed number of characters	___	___	___	___	___	
- variable number of characters	___	___	___	___	___	
j. System supports use of search term qualifiers:						
- form of publication	___	___	___	___	___	
- medium of publication	___	___	___	___	___	
- data element type	___	___	___	___	___	
- data field type	___	___	___	___	___	
- data base identifier						
- other _____	___	___	___	___	___	
k. System permits user to limit search by:						
- setting universe within which search will be performed and data retrieved (DTIC, local, or both)	___	___	___	___	___	
- number of items to search	___	___	___	___	___	
- minimum number of "OR" terms in the same data record	___	___	___	___	___	
- search term weighting	___	___	___	___	___	

BENCHMARKING CHECKLIST: REFERENCE (CONTINUED)

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
- most recent data base updates	___	___	___	___	___	
- records excluded in earlier search	___	___	___	___	___	
- other _____	___	___	___	___	___	
l. Search accepts various forms of a search term	___	___	___	___	___	
m. System employs a stop word list	___	___	___	___	___	
n. System automatically applies stop word list to user search expressions	___	___	___	___	___	
o. System supports full range of:						
- search commands	___	___	___	___	___	
- search requests	___	___	___	___	___	
- search responses	___	___	___	___	___	
p. System provides workforms or templates for search expression formulation	___	___	___	___	___	
q. System supports menu-driven searching using:						
- fixed menu approach	___	___	___	___	___	
- flexible menu approach	___	___	___	___	___	
- user selection of menu level	___	___	___	___	___	

BENCHMARKING CHECKLIST: REFERENCE (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
*	r. System supports searching of multiple data bases (running on the local machine) at one time	—	—	—	—	—	
	s. Search expression input via:						
	- keyboard	—	—	—	—	—	
	- menu	—	—	—	—	—	
	- optical character reader	—	—	—	—	—	
	2. Retrieval						
*	a. System supports many data base access points:						
	- titles	—	—	—	—	—	
	- personal authors	—	—	—	—	—	
	- corporate authors	—	—	—	—	—	
	- subject headings	—	—	—	—	—	
	- any field can be defined as retrievable	—	—	—	—	—	
*	b. System retrieves records from multiple files with single search	—	—	—	—	—	
*	c. System provides a variety of retrieval controls:						
	- set/change defaults for display formats	—	—	—	—	—	

BENCHMARKING CHECKLIST: REFERENCE (CONTINUED)

FUNCTION/FEATURE	SCORE					COMMENTS
	1	2	3	4	5	
- display search status at any time	___	___	___	___	___	
- set print line length	___	___	___	___	___	
- set page or screen size	___	___	___	___	___	
- specify lifetime of saved search	___	___	___	___	___	
- set format of output	___	___	___	___	___	
* d. System limits use of controls by authorization	___	___	___	___	___	
e. System supports browsing:						
- in index files	___	___	___	___	___	
- in retrieved data item list	___	___	___	___	___	
- in thesaurus or authority list	___	___	___	___	___	
- forward	___	___	___	___	___	
- backward	___	___	___	___	___	
f. System supports adjacent term display when search is not in index file	___	___	___	___	___	
g. System supports display of index terms which correspond with an explicitly truncated search term	___	___	___	___	___	
h. System supports retrieval qualifiers	___	___	___	___	___	

BENCHMARKING CHECKLIST: REFERENCE (CONTINUED)

		FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	i.	System supports retrieval from authority file or thesaurus for search expression formulation, etc.	___	___	___	___	___	
	j.	System permits retrieval to be limited by:						
		- universe	___	___	___	___	___	
		- qualifiers	___	___	___	___	___	
		- number of items (in succession or at intervals)	___	___	___	___	___	
*	k.	Null retrieval produces message	___	___	___	___	___	
	l.	Single-citation retrieval produces:						
		- abbreviated citation for initial retrieval	___	___	___	___	___	
		- brief citation on request	___	___	___	___	___	
*		- full citation on request	___	___	___	___	___	
	m.	Multiple-citation retrieval produces:						
*		- initial count of hits (responses)	___	___	___	___	___	
		- initial list of truncated citations	___	___	___	___	___	
		- subsequent list of expanded partial citations on request	___	___	___	___	___	
*		- full citation on request	___	___	___	___	___	

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
3. Display/Printed Output						
* a. System displays messages:						
- logon and logoff	___	___	___	___	___	
- session initiation and termination	___	___	___	___	___	
- error messages	___	___	___	___	___	
- exceptional conditions	___	___	___	___	___	
- information messages	___	___	___	___	___	
- instructional/help messages	___	___	___	___	___	
* b. System supports data displays of varying content:						
- bibliographic data displays	___	___	___	___	___	
- holdings and location data displays	___	___	___	___	___	
- numeric data displays	___	___	___	___	___	
- textual data displays	___	___	___	___	___	
- search status displays	___	___	___	___	___	
- adjacent term displays	___	___	___	___	___	
- displays of index terms corresponding with truncated search term	___	___	___	___	___	
- report displays	___	___	___	___	___	
- browse mode displays	___	___	___	___	___	
- budget and other financial data displays	___	___	___	___	___	
- routing data displays (for serials)	___	___	___	___	___	
- delinquency data displays	___	___	___	___	___	

BENCHMARKING CHECKLIST: REFERENCE (CONTINUED)

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
- other _____	___	___	___	___	___	
c. System supports several forms of display:						
- count of retrieved items	___	___	___	___	___	
- abbreviated entry displays (with user-selected formats and content)	___	___	___	___	___	
- full record displays	___	___	___	___	___	
d. Data displayed in a meaningful form for each type of use	___	___	___	___	___	
* e. System provides workforms or templates for data entry:						
- search expression formulation	___	___	___	___	___	
- gateways	___	___	___	___	___	
- bibliographic workform or template	___	___	___	___	___	
- report generation workform	___	___	___	___	___	
- other _____	___	___	___	___	___	
f. System supports various data representations in displays (e.g. coded data, abbreviations, etc.)	___	___	___	___	___	
g. System provides a variety of display formats (e.g. list, paragraphed, tabular)	___	___	___	___	___	

BENCHMARKING CHECKLIST: REFERENCE (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
*	h. System provides various orderings of records and data elements in displays (e.g. by title, name, subject, etc.)	___	___	___	___	___	
*	i. System supports protected fields in displays	___	___	___	___	___	
	j. System supports intelligent terminals	___	___	___	___	___	
	k. System provides displays in multiple colors and intensities	___	___	___	___	___	
	l. System makes use of reverse imaging	___	___	___	___	___	
*	m. System supports workstation printers	___	___	___	___	___	
	4. Disposition of Retrieved Data						
*	a. System supports down-loading of retrieved data	___	___	___	___	___	
*	b. System permits retrieved data to be processed by user software (post-processing)	___	___	___	___	___	
	c. System permits user specification of system device to be used for output	___	___	___	___	___	

APPENDIX B

BENCHMARKING CHECKLIST: CATALOGING

This appendix contains the benchmarking checklist for the "Cataloging" function and features. One set of checklists must be completed for <u>each</u> different system tested. Check only one score per feature. Indicate your score by placing a mark in the column corresponding to the score you feel most accurately describes the feature. Use the following scoring scale and corresponding criteria:

1 - No, the package does not offer the feature
2 - Yes, the package offers the feature but with severe limitations
3 - Yes, the package offers the feature with moderate limitations
4 - Yes, the package offers the feature with minor limitations
5 - Yes, the package offers the feature without limitations

Please make any additional comments in the space provided on the checklist. If there is not enough room for your comments, please use the reverse side of the checklist or attach a separate sheet of paper with the comments. Make clear reference to the function and feature you are commenting on by using the same numbering system or title used on the checklist.

As you perform your evaluations, pay particular attention to the features marked with " * " in the left-hand margin. These features are considered critical to the implementation of the system and deserve special attention during benchmarking.

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BENCHMARKING CHECKLIST: CATALOGING

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
1.	Duplicate Checking						
	a. System provides workform or template (on the video display terminal screen) for entering a search of the data base to check for possible duplicate citations	___	___	___	___	___	
*	b. System performs specified search and retrieves and displays records which meet search criteria	___	___	___	___	___	
	c. System provides the user a choice of output formats for citations found during a duplicate check search (abbreviated or full length citations)	___	___	___	___	___	
2.	Data Entry						
*	a. System provides on-line updating of catalog	___	___	___	___	___	
*	b. System provides convenient workforms or templates for entry of bibliographic data during cataloging	___	___	___	___	___	

BENCHMARKING CHECKLIST: CATALOGING (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
*	c. Data entry modes supported:						
	- on-line (user terminal)	___	___	___	___	___	
	- batch	___	___	___	___	___	
	d. Input devices supported:						
*	- keyboard	___	___	___	___	___	
	- wand reader	___	___	___	___	___	
	- stationary reader	___	___	___	___	___	
*	- magnetic tape (reel or cassette)	___	___	___	___	___	
*	- disk	___	___	___	___	___	
	- diskette	___	___	___	___	___	
	- other _____	___	___	___	___	___	
*	e. System produces helpful messages in response to user requests for assistance/help or in response to errors entered by the user	___	___	___	___	___	
*	f. Transactions journalized to provide for back-up and recovery (system operator testing)	___	___	___	___	___	
	3. Data Editing and Modification						
	a. During on-line cataloging, the system allows the user to edit and correct input data without re-entering the entire record	___	___	___	___	___	

BENCHMARKING CHECKLIST: CATALOGING (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	b. System allows for entry of bibliographic records in steps, with input being saved at each step for editing and augmentation at successive steps	___	___	___	___	___	
	c. System provides global search and replace	___	___	___	___	___	
	d. System provides range search and replace	___	___	___	___	___	
*	e. Once entered by the user, the system performs error checking for:						
	- coded values	___	___	___	___	___	
	- required spacing and punctuation	___	___	___	___	___	
	- internal consistency of data	___	___	___	___	___	
	- presence of required data element values	___	___	___	___	___	
	- duplicate data	___	___	___	___	___	
	4. Data Update						
*	a. System automatically restricts or controls user access for modifying or updating data base (catalog) contents	___	___	___	___	___	

BENCHMARKING CHECKLIST: CATALOGING (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	b. System supports data base updating by:						
	- adding citations	___	___	___	___	___	
	- deleting citations	___	___	___	___	___	
	- replacing existing citations	___	___	___	___	___	
	- deleting or adding terms on authority lists corresponding to added or deleted citations	___	___	___	___	___	
*	c. System supports on-line modification of data in individual records:						
	- add data	___	___	___	___	___	
	- change data	___	___	___	___	___	
	- delete data	___	___	___	___	___	
*	d. System supports record update at:						
	- data element level	___	___	___	___	___	
	- field level	___	___	___	___	___	
*	e. System provides record looking during update (records being updated cannot be accessed by other users through retrieval applications)	___	___	___	___	___	

BENCHMARKING CHECKLIST: CATALOGING (CONTINUED)

	FUNCTION/FEATURE	SCORE					COMMENTS
		1	2	3	4	5	
*	f. System provides immediate access to all newly created records (once update is completed and records are released from any lock-out controls)	___	___	___	___	___	

APPENDIX C

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL

This appendix contains the benchmarking checklist for the "Circulation Management and Control" function and features. One set of checklists must be completed for <u>each</u> different system tested. Check only one score per feature. Indicate your score by placing a mark in the column corresponding to the score you feel most accurately describes the feature. Use the following scoring scale and corresponding criteria:

1 - No, the package does not offer the feature
2 - Yes, the package offers the feature but with severe limitations
3 - Yes, the package offers the feature with moderate limitations
4 - Yes, the package offers the feature with minor limitations
5 - Yes, the package offers the feature without limitations

Please make any additional comments in the space provided on the checklist. If there is not enough room for your comments, please use the reverse side of the checklist or attach a separate sheet of paper with the comments. Make clear reference to the function and feature you are commenting on by using the same numbering system or title used on the checklist.

As you perform your evaluations, pay particular attention to the features marked with " * " in the left-hand margin. These features are considered critical to the implementation of the system and deserve special attention during benchmarking.

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BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL

FUNCTION/FEATURE	SCORE					COMMENTS
	1	2	3	4	5	
1. Data Entry						
a. System provides workforms or templates for data entry:						
- patron record workform	___	___	___	___	___	
- routing data (for serials)	___	___	___	___	___	
- patron profile data	___	___	___	___	___	
2. Patron Identification						
a. System displays clearance level and need-to-know of patron	___	___	___	___	___	
b. System employs machine-readable patron identification numbers (PIN) to identify patron to system	___	___	___	___	___	
c. PINs are readable by:						
- wand reader on terminal	___	___	___	___	___	
- stationary laser reader	___	___	___	___	___	
- stationary metallic-dot reader	___	___	___	___	___	
- other _____	___	___	___	___	___	
d. Preprinted PIN labels are used	___	___	___	___	___	
e. Special patron cards are used	___	___	___	___	___	

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
f. System prints PIN labels in batch or on demand	___	___	___	___	___	
g. System will not allow reuse of PIN that has been reported lost or stolen	___	___	___	___	___	
h. System supports other patron identification numbers:						
- DNA badge/employee number	___	___	___	___	___	
- social security number	___	___	___	___	___	
3. Item Identification						
a. System employs machine-readable item identification numbers (IIN) to identify individual bibliographic items	___	___	___	___	___	
b. IINs are readable by:						
- wand reader on terminal	___	___	___	___	___	
- stand-alone laser reader	___	___	___	___	___	
- stationary metallic-dot reader	___	___	___	___	___	
c. IINs are usable in other library applications such as serials control and circulation control	___	___	___	___	___	

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	d. Preprinted or prepared IIN labels are used	___	___	___	___	___	
	e. System prints IIN labels in batch or on demand	___	___	___	___	___	
*	f. System supports other item identification numbers:						
	- local system number (DTL number)	___	___	___	___	___	
	- AD number	___	___	___	___	___	
	4. Holding Charge-out						
	a. System permits charging of items to patrons	___	___	___	___	___	
	b. System requires patron identification number input before charge	___	___	___	___	___	
	c. System permits multiple items to be charged with single PIN entry	___	___	___	___	___	
	d. Patron and item identification numbers are quickly and accurately entered by:	___	___	___	___	___	
	- wand reader	___	___	___	___	___	
	- stationary laser scanner	___	___	___	___	___	

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL (CONTINUED)

	FUNCTION/FEATURE	SCORE					COMMENTS
		1	2	3	4	5	
	- keyboard	___	___	___	___	___	
	- other device _____	___	___	___	___	___	
	e. Erroneous identification number reads are signaled to the operator by the system	___	___	___	___	___	
	f. Charge of item not previously discharged causes automatic discharge from previous patron	___	___	___	___	___	
	g. Numerous patron types supported	___	___	___	___	___	
	h. Numerous material types supported	___	___	___	___	___	
	i. Loan periods selected by library staff at time of check-out	___	___	___	___	___	
	j. System supports printing of date due slips at workstation:						
	- routinely	___	___	___	___	___	
	- on demand	___	___	___	___	___	
*	k. System supports printing of classified document receipts at workstation:						
	- routinely	___	___	___	___	___	
	- on demand	___	___	___	___	___	

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL (CONTINUED)

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
l. System supports charge via portable terminal	___	___	___	___	___	
m. System automatically notifies user that patron being charged with item has other delinquencies	___	___	___	___	___	
n. Password (or equivalent) required for overrides	___	___	___	___	___	
o. All types of material may be charged including serial issues, equipment, facilities, etc.	___	___	___	___	___	
5. Discharge						
a. System permits discharge of items returned by patron	___	___	___	___	___	
b. System requires entry of item identification number:						
- by wand reader	___	___	___	___	___	
- by stationary laser scanner	___	___	___	___	___	
- by stationary metallic-dot reader	___	___	___	___	___	
- by other means _____	___	___	___	___	___	
c. Discharge is fast and error free	___	___	___	___	___	

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL (CONTINUED)

FUNCTION/FEATURE	SCORE					COMMENTS
	1	2	3	4	5	
d. Unsucessful discharge is signaled to operator	___	___	___	___	___	
e. System produces discharge receipts:						
- routinely	___	___	___	___	___	
- on demand	___	___	___	___	___	
f. System permits suitably authorized staff to backdate a discharge	___	___	___	___	___	
g. System automatically produces transit slip when item must be sent to another location	___	___	___	___	___	
h. System identifies items not charged	___	___	___	___	___	
6. Controlled Circulation						
a. System supports controlled circulation of items to patrons	___	___	___	___	___	
b. System permits creation and maintenance of patron interest profiles	___	___	___	___	___	
c. System maintains routing list for each item included in controlled circulation:	___	___	___	___	___	
- by person	___	___	___	___	___	

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL (CONTINUED)

FUNCTION/FEATURE	SCORE					COMMENTS
	1	2	3	4	5	
- by department or other organizational unit	___	___	___	___	___	
- by other designation _____	___	___	___	___	___	
d. System provides manual override of automatic routing	___	___	___	___	___	
e. Routing list is maintained:						
- on-line	___	___	___	___	___	
- batch mode	___	___	___	___	___	
f. Library staff must indicate to system which items should be routed to each patron	___	___	___	___	___	
7. Renewal						
a. System supports renewal of charged items	___	___	___	___	___	
b. Renewal function is controlled by patron and material types	___	___	___	___	___	
c. Loan periods governed by:						
- system tables	___	___	___	___	___	
- according to material type	___	___	___	___	___	
- according to patron type	___	___	___	___	___	

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL (CONTINUED)

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
d. System permits renewal of item without item or patron present	___	___	___	___	___	
e. Telephone renewal requires both PIN and IIN	___	___	___	___	___	
f. System limits successive renewals:						
- by item	___	___	___	___	___	
- by patron	___	___	___	___	___	
g. System prevents renewal if recall for item is outstanding	___	___	___	___	___	
h. System resolves holds/renewal conflicts	___	___	___	___	___	
8. Holds						
a. System permits placing of holds on items	___	___	___	___	___	
b. System governs placement of holds by:						
- patron type	___	___	___	___	___	
- material type	___	___	___	___	___	
- number of holds already outstanding on an item	___	___	___	___	___	
- patron delinquencies	___	___	___	___	___	

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL (CONTINUED)

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
c. Holds can be placed at title-specific level	___	___	___	___	___	
d. System limits:						
- number of holds per title	___	___	___	___	___	
- number of holds per patron	___	___	___	___	___	
e. System supports:						
- hold activation date	___	___	___	___	___	
- hold cancellation date	___	___	___	___	___	
f. System permits hold queue modification (password required)	___	___	___	___	___	
g. System produces hold listings:						
- in printed form	___	___	___	___	___	
- on-line	___	___	___	___	___	
h. System produces hold notices (See III.5 Notices)	___	___	___	___	___	
9. Recalls						
a. System permits recall of items on request	___	___	___	___	___	

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL (CONTINUED)

FUNCTION/FEATURE	SCORE					COMMENTS
	1	2	3	4	5	
b. Requests are governed by:						
- patron type	___	___	___	___	___	
- material type	___	___	___	___	___	
- item status	___	___	___	___	___	
- type of requestor	___	___	___	___	___	
- reason for recall	___	___	___	___	___	
- other conditions _____	___	___	___	___	___	
- combination of other factors	___	___	___	___	___	
c. Recalls require both PIN and IIN	___	___	___	___	___	
d. Recall notices produced by system	___	___	___	___	___	
e. System places block on patron who has not returned recalled item	___	___	___	___	___	
f. System supports:						
- recall after specified date	___	___	___	___	___	
- recall cancellation date	___	___	___	___	___	
g. System limits number of recall requests per patron	___	___	___	___	___	
h. System produces recall list:						
- in printed form	___	___	___	___	___	
- on-line	___	___	___	___	___	

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL (CONTINUED)

FUNCTION/FEATURE	SCORE					COMMENTS
	1	2	3	4	5	
10. Overdues						
a. System permits detection and notification of overdue holdings	___	___	___	___	___	
b. System automatically determines overdue date based on:						
- charge date	___	___	___	___	___	
- loan period	___	___	___	___	___	
- grace period	___	___	___	___	___	
- non-chargeable days (e.g. holidays)	___	___	___	___	___	
c. System blocks additional charges for patron with overdue materials	___	___	___	___	___	
d. System permits override of block by authorized staff member	___	___	___	___	___	
e. System provides for overdue threshold (beyond which patron may not charge additional items)	___	___	___	___	___	
f. System produces overdue notices	___	___	___	___	___	
g. System records overdues on delinquency report	___	___	___	___	___	
h. System records overrides in audit trail	___	___	___	___	___	

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL (CONTINUED)

FUNCTION/FEATURE	SCORE					COMMENTS
	1	2	3	4	5	
11. Reserve Collection Management						
a. System permits library to establish and maintain a reserve collection	___	___	___	___	___	
b. System treats reserve collection as a pseudo-patron to which items may be charged for defined time periods	___	___	___	___	___	
c. System supports inclusion of uncataloged material in reserve collection	___	___	___	___	___	
d. System supports all functions and features of circulation under reserve collection management	___	___	___	___	___	
e. System provides for loan periods established by library (1 hour, 3 hour, 1 day, etc.)	___	___	___	___	___	
f. System supports special patron classes	___	___	___	___	___	
g. System recognizes materials belonging in the reserve collection wherever they are discharged	___	___	___	___	___	
h. System records statistics for reserve collection activity separately from those for regular collection	___	___	___	___	___	

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL (CONTINUED)

FUNCTION/FEATURE	SCORE					COMMENTS
	1	2	3	4	5	
12. Interlibrary Loan						
a. System supports dual-level functions and features of circulation (e.g. charge to library and charge to patron)	___	___	___	___	___	
b. System permits separate loan periods and other parameters in interlibrary loan	___	___	___	___	___	
c. System provides all circulation functions and features in interlibrary loan	___	___	___	___	___	
d. System permits discharge of item at lending library without discharge at borrowing library	___	___	___	___	___	
13. Materials Booking						
a. System permits booking of:						
- equipment	___	___	___	___	___	
- films	___	___	___	___	___	
- audiovisual materials	___	___	___	___	___	
- other materials _____	___	___	___	___	___	
- meeting rooms	___	___	___	___	___	

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
b. System supports special:						
- material types	___	___	___	___	___	
- patron classes	___	___	___	___	___	
- loan periods	___	___	___	___	___	
- fine amounts (and other charges)	___	___	___	___	___	
c. System supports materials, equipment, and facilities inventory	___	___	___	___	___	
d. System supports:						
- charge	___	___	___	___	___	
- discharge	___	___	___	___	___	
- renewal	___	___	___	___	___	
- holds	___	___	___	___	___	
14. Physical Preparation						
a. System accepts machine-readable item identifier (barcode, OCR, or metallic-dot)	___	___	___	___	___	
b. System produces machine-readable item identifier labels	___	___	___	___	___	
c. System uses preprinted or prepared labels	___	___	___	___	___	

BENCHMARKING CHECKLIST: CIRCULATION MANAGEMENT AND CONTROL (CONTINUED)

FUNCTION/FEATURE	SCORE					COMMENTS
	1	2	3	4	5	
d. System prints call number or accession number labels for items as required	___	___	___	___	___	

APPENDIX D

BENCHMARKING CHECKLIST: REPORTS AND OTHER PRINTED OUTPUT

This appendix contains the benchmarking checklist for "Reports and Other Printed Output" features. One set of checklists must be completed for <u>each</u> different system tested. Check only one score per feature. Indicate your score by placing a mark in the column corresponding to the score you feel most accurately describes the feature. Use the following scoring scale and corresponding criteria:

1 - No, the package does not offer the feature
2 - Yes, the package offers the feature but with severe limitations
3 - Yes, the package offers the feature with moderate limitations
4 - Yes, the package offers the feature with minor limitations
5 - Yes, the package offers the feature without limitations

Please make any additional comments in the space provided on the checklist. If there is not enough room for your comments, please use the reverse side of the checklist or attach a separate sheet of paper with the comments. Make clear reference to the function and feature you are commenting on by using the same numbering system or title used on the checklist.

As you perform your evaluations, pay particular attention to the features marked with " * " in the left-hand margin. These features are considered critical to the implementation of the system and deserve special attention during benchmarking.

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BENCHMARKING CHECKLIST: REPORTS AND OTHER PRINTED OUTPUT

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
1. Reports						
* a. On-line report preparation and generation:						
- on-demand	___	___	___	___	___	
- preprogrammed	___	___	___	___	___	
b. Batch report preparation and generation:						
- on-demand	___	___	___	___	___	
- preprogrammed	___	___	___	___	___	
c. Activity reports produced (pre-programmed):						
- activity summary	___	___	___	___	___	
- services used	___	___	___	___	___	
- financial report	___	___	___	___	___	
- holds placed	___	___	___	___	___	
- user-file status report	___	___	___	___	___	
- audit trail summary	___	___	___	___	___	
- other _____	___	___	___	___	___	
* d. Activity reports (on-demand):						
- patron activity	___	___	___	___	___	

BENCHMARKING CHECKLIST: REPORTS AND OTHER PRINTED OUTPUT (CONTINUED)

FUNCTION/FEATURE	SCORE					COMMENTS
	1	2	3	4	5	
- items retrieved	___	___	___	___	___	
- items not found (null response to search)	___	___	___	___	___	
- charges journal	___	___	___	___	___	
- private files (status, age, etc.)	___	___	___	___	___	
- other _____	___	___	___	___	___	
e. Exception reports produced:						
- lengthy retrieval output	___	___	___	___	___	
- audit trail exceptions	___	___	___	___	___	
- other _____	___	___	___	___	___	
f. Activity data reports:						
- searches (by type)	___	___	___	___	___	
- patron activity report	___	___	___	___	___	
- retrieval activity report	___	___	___	___	___	
- holds list	___	___	___	___	___	
- private file limits expiration	___	___	___	___	___	
- saved search formulation time limits expired	___	___	___	___	___	
- patron use statistics by parton type and function	___	___	___	___	___	
- terminal statistics by time period	___	___	___	___	___	
- line statistics	___	___	___	___	___	
- item activity report by class or subject, type, patron class, etc.	___	___	___	___	___	

BENCHMARKING CHECKLIST: REPORTS AND OTHER PRINTED OUTPUT (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	g. Data base statistics:						
*	- number of bibliographic records	___	___	___	___	___	
*	- number of patron records	___	___	___	___	___	
	- record length (mean, standard deviation, extremes)	___	___	___	___	___	
	- number of access points per data record, by file type	___	___	___	___	___	
	- number of index entries by type	___	___	___	___	___	
	- number of bibliographic, item, patron, or other	___	___	___	___	___	
	- records per index entry by entry type (mean, standard deviation, extremes)	___	___	___	___	___	
	- data base activity volumes	___	___	___	___	___	
*	- data transfers from LAM to DTIC and vice versa	___	___	___	___	___	
	h. System performance data:						
	- active terminals per time period	___	___	___	___	___	
	- response time (mean, maximum, minimum) for each type of basic function (e.g. charge, discharge)	___	___	___	___	___	
	- data base accesses	___	___	___	___	___	
	- other _____	___	___	___	___	___	

BENCHMARKING CHECKLIST: REPORTS AND OTHER PRINTED OUTPUT (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
2.	Report Generator						
	a. System provides a wide range of choices of report formatting options:						
	- tabular as well as text presentation	___	___	___	___	___	
	- column justification	___	___	___	___	___	
	- column widths	___	___	___	___	___	
	- number of lines per page	___	___	___	___	___	
	- number of significant digits	___	___	___	___	___	
	- paragraph indentation	___	___	___	___	___	
	- page headers and footers	___	___	___	___	___	
	- footnotes	___	___	___	___	___	
	- underscoring	___	___	___	___	___	
	- overstriking	___	___	___	___	___	
*	b. Sorting capability (at least three nested levels)	___	___	___	___	___	
*	c. Report generator allows for specification of the data content of a report, including:						
	- choice of titles	___	___	___	___	___	
	- choice of column headings	___	___	___	___	___	
	- choice of data elements	___	___	___	___	___	
	- choice of row labels	___	___	___	___	___	
	- content of headers and footers	___	___	___	___	___	
	- automatic or forced pagination	___	___	___	___	___	

BENCHMARKING CHECKLIST: REPORTS AND OTHER PRINTED OUTPUT (CONTINUED)

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
d. System provides a wide variety of data manipulation capabilities for system statistical activity reports:						
- choice of mathematical and statistical operations						
-- sums	___	___	___	___	___	
-- differences	___	___	___	___	___	
-- means	___	___	___	___	___	
-- maxima	___	___	___	___	___	
-- mimina	___	___	___	___	___	
-- mode	___	___	___	___	___	
-- cross correlations	___	___	___	___	___	
-- other selected statistical functions	___	___	___	___	___	
- hyphenation	___	___	___	___	___	
- margin justification	___	___	___	___	___	
e. System supports flexible output modes:						
- graphics output (high and low resolution)	___	___	___	___	___	
* - printed output	___	___	___	___	___	
- video output	___	___	___	___	___	
- color, intensity, etc.	___	___	___	___	___	
* - machine-readable output (e.g. magnetic tape for comprinter)	___	___	___	___	___	

BENCHMARKING CHECKLIST: REPORTS AND OTHER PRINTED OUTPUT (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
*	f. System gives user the option of saving report generation specifications for future use	___	___	___	___	___	
	g. System enables user to save report for future use (microfiche)	___	___	___	___	___	
	3. Support Facilities						
*	a. System permits user to save search expressions	___	___	___	___	___	
*	b. System permits user to retrieve and execute saved search expressions	___	___	___	___	___	
*	c. System permits saving of report generation specifications	___	___	___	___	___	
*	d. System permits retrieval and execution of report generation specifications	___	___	___	___	___	
	e. System permits retrieval of system status information (authorization required)	___	___	___	___	___	

BENCHMARKING CHECKLIST: REPORTS AND OTHER PRINTED OUTPUT (CONTINUED)

FUNCTION/FEATURE	SCORE					COMMENTS
	1	2	3	4	5	
- log number	___	___	___	___	___	
5. Printed Output						
System supports printing at workstations of:						
- bibliographies	___	___	___	___	___	
- user/system dialogs	___	___	___	___	___	
- indexes	___	___	___	___	___	
- abstracts (from DTIC)	___	___	___	___	___	
- term relationships (vocabulary maps)	___	___	___	___	___	
- graphs, bar charts, pie charts, etc.	___	___	___	___	___	
- tables (of data)	___	___	___	___	___	
- special reports	___	___	___	___	___	
- various data displays for off-line use, checking and/or verification	___	___	___	___	___	
- notices, on demand	___	___	___	___	___	
- hold slips	___	___	___	___	___	
- receipts (charges), for classified documents	___	___	___	___	___	
- transit notices (picking slips)	___	___	___	___	___	
- other _____	___	___	___	___	___	

BENCHMARKING CHECKLIST: REPORTS AND OTHER PRINTED OUTPUT (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
4.	**Receipts**						
	a. System supports production of receipts and other brief printed output:						
*	- at workstation printer	___	___	___	___	___	
	- at shared printer	___	___	___	___	___	
	- in batch mode	___	___	___	___	___	
	b. System records production of receipts	___	___	___	___	___	
	c. System controls receipt production by function:						
*	- on-demand receipts	___	___	___	___	___	
	- routine production	___	___	___	___	___	
	- no receipts	___	___	___	___	___	
	d. System permits operator to change receipt production control on an as-needed basis	___	___	___	___	___	
*	e. Receipts are identified as to type:						
	- type (e.g. data base use, private file use)	___	___	___	___	___	
	- library	___	___	___	___	___	
	- date and time	___	___	___	___	___	
	- patron identification number	___	___	___	___	___	
	- security classification	___	___	___	___	___	

APPENDIX E

BENCHMARKING CHECKLIST: SECURITY AND ACCESS CONTROL

This appendix contains the benchmarking checklist for "Security and Access Control" features. One set of checklists must be completed for <u>each</u> different system tested. Check only one score per feature. Indicate your score by placing a mark in the column corresponding to the score you feel most accurately describes the feature. Use the following scoring scale and corresponding criteria:

1 - No, the package does not offer the feature
2 - Yes, the package offers the feature but with severe limitations
3 - Yes, the package offers the feature with moderate limitations
4 - Yes, the package offers the feature with minor limitations
5 - Yes, the package offers the feature without limitations

Please make any additional comments in the space provided on the checklist. If there is not enough room for your comments, please use the reverse side of the checklist or attach a separate sheet of paper with the comments. Make clear reference to the function and feature you are commenting on by using the same numbering system or title used on the checklist.

As you perform your evaluations, pay particular attention to the features marked with " * " in the left-hand margin. These features are considered critical to the implementation of the system and deserve special attention during benchmarking.

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BENCHMARKING CHECKLIST: SECURITY AND ACCESS CONTROL

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
1.	**Audit Trail**						
*	a. System maintains audit trail for all transactions that affect integrity of the data base	___	___	___	___	___	
*	b. System maintains audit trail for all transactions that relate to access to data base	___	___	___	___	___	
*	c. System maintains audit trail for all software maintenance	___	___	___	___	___	
*	d. System maintains audit trail for all financial transactions (e.g. acquisition, budgeting and ordering)	___	___	___	___	___	
*	e. System supports on-line, read-only access to audit trail data given suitable access control level	___	___	___	___	___	
*	f. Audit trail maintained in machine-readable form	___	___	___	___	___	
*	g. Audit trail not alterable	___	___	___	___	___	

BENCHMARKING CHECKLIST: SECURITY AND ACCESS CONTROL (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	h. System tracks:						
*	- use of internal data base	___	___	___	___	___	
*	- use of external data base	___	___	___	___	___	
	- use of search and retrieval features	___	___	___	___	___	
	- use of output facilities	___	___	___	___	___	
	- routing	___	___	___	___	___	
*	- data entry and update	___	___	___	___	___	
	i. Audit trail records identify:						
*	- person effecting transaction	___	___	___	___	___	
*	- function/feature performed or attempted	___	___	___	___	___	
*	- date and time of access attempt	___	___	___	___	___	
	- transaction data	___	___	___	___	___	
	- terminal used	___	___	___	___	___	
	- telecommunication line used	___	___	___	___	___	
	- library	___	___	___	___	___	
	- library unit	___	___	___	___	___	
	- data base or program accessed	___	___	___	___	___	
	j. System supports production of a variety of reports based on audit trail data	___	___	___	___	___	
	2. Work Tracking						
	a. System tracks items through workstations via machine-readable item identification numbers	___	___	___	___	___	

BENCHMARKING CHECKLIST: SECURITY AND ACCESS CONTROL (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	- does not display access codes	—	—	—	—	—	
*	h. Data base integrity ensured	—	—	—	—	—	
*	i. System maintains audit trail of all access attempts (successful and unsuccessful)	—	—	—	—	—	

BENCHMARKING CHECKLIST: SECURITY AND ACCESS CONTROL (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	b. System tracks items through workstation via user input	___	___	___	___	___	
	c. System creates and maintains work tracking record containing:						
	- item identification number or personal ID number	___	___	___	___	___	
	- date and time of start of processing of work unit (session, item, etc.)	___	___	___	___	___	
	- date and time of end of processing of work unit	___	___	___	___	___	
	- workstation identifier	___	___	___	___	___	
	- patron or staff member identifier	___	___	___	___	___	
	- type of work unit	___	___	___	___	___	
	- notes	___	___	___	___	___	
	d. System produces work tracking summary reports:						
	- routinely	___	___	___	___	___	
	- on demand	___	___	___	___	___	
	3. Access Control						
*	a. Prevents unauthorized access to any system function, feature, or data	___	___	___	___	___	

BENCHMARKING CHECKLIST: SECURITY AND ACCESS CONTROL (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
*	b. Prevents unauthorized changes or deletions of data	___	___	___	___	___	
*	c. Prevents unauthorized down-loading or transfer of data	___	___	___	___	___	
*	d. Differentiates between levels of users	___	___	___	___	___	
	e. Distinguishes system operators from staff users	___	___	___	___	___	
	f. Distinguishes logon/logoff from system initiation/termination	___	___	___	___	___	
	g. Achieves access control by:						
	- system-assigned user identification	___	___	___	___	___	
	- system-assigned password	___	___	___	___	___	
	- user-assigned password	___	___	___	___	___	
*	- combination of system-assigned identification number and user-assigned password	___	___	___	___	___	
	- function-level identification number or password	___	___	___	___	___	
	- terminal level control						
	-- by group	___	___	___	___	___	
	-- by terminal	___	___	___	___	___	
	-- by time of day	___	___	___	___	___	
	- task/activity level	___	___	___	___	___	
	- transaction level	___	___	___	___	___	

APPENDIX F

BENCHMARKING CHECKLIST: RELIABILITY AND MAINTAINABILITY

This appendix contains the benchmarking checklist covering "Reliability and Maintainability" aspects of the system being tested. One set of checklists must be completed for <u>each</u> different system tested. Check only one score per feature. Indicate your score by placing a mark in the column corresponding to the score you feel most accurately describes the feature. Use the following scoring scale and corresponding criteria:

1 - No, the package does not offer the feature
2 - Yes, the package offers the feature but with severe limitations
3 - Yes, the package offers the feature with moderate limitations
4 - Yes, the package offers the feature with minor limitations
5 - Yes, the package offers the feature without limitations

Please make any additional comments in the space provided on the checklist. If there is not enough room for your comments, please use the reverse side of the checklist or attach a separate sheet of paper with the comments. Make clear reference to the function and feature you are commenting on by using the same numbering system or title used on the checklist.

As you perform your evaluations, pay particular attention to the features marked with " * " in the left-hand margin. These features are considered critical to the implementation of the system and deserve special attention during benchmarking.

Additional copies of this appendix may be reproduced locally or may be obtained from the Logistics Management Institute, Attention: DL501 Project Leader, 6400 Goldsboro Road, Bethesda, MD 20817-5886. Completed checklists should be mailed to this address also.

BENCHMARKING CHECKLIST: RELIABILITY AND MAINTAINABILITY

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
1. Resilience Under Load						
a. System capable of controlling volume of incoming traffic:						
- by applying back-pressure on terminal users	___	___	___	___	___	
- by priority of messages	___	___	___	___	___	
- by deactivating communication ports	___	___	___	___	___	
b. System performance degrades slowly with increased load	___	___	___	___	___	
c. System recovers quickly as load diminishes	___	___	___	___	___	
d. Crash recovery is no more difficult during periods of peak loading than at other times	___	___	___	___	___	
2. System Reliability						
a. System available 95% of scheduled time	___	___	___	___	___	

BENCHMARKING CHECKLIST: RELIABILITY AND MAINTAINABILITY (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
*	b. System available 97% of scheduled time	___	___	___	___	___	
	c. System available 99% of scheduled time	___	___	___	___	___	
*	d. System vendor provides contractual assurance of up-time	___	___	___	___	___	
	e. Weakest component/link:						
	- processing (transactions)	___					Rather than apply the normal scoring to these features, simply rank order the components from weakest (score-1) to strongest(score-5). The same score may be applying to more than one component.
	- data base management system	___					
	- telecommunications	___					
	- peripherals	___					
	- insulation from power losses	___					
	- insulation from central system failure	___					
	- back-up/recovery	___					
	- vendor/maintenance	___					
	- documentation	___					
	- availability of source code	___					
	3. System Capacity						
*	a. System can be conveniently sized for a given installation						
	- data base capacity	___	___	___	___	___	
	- number of terminals	___	___	___	___	___	
	- memory size	___	___	___	___	___	

BENCHMARKING CHECKLIST: RELIABILITY AND MAINTAINABILITY (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	- number of communication ports	___	___	___	___	___	
	- processor capacity (transactions per second)	___	___	___	___	___	
	b. System can be shared by two or more functional units:						
	- with common policies	___	___	___	___	___	
	- with distinct policies	___	___	___	___	___	
	c. System can be readily expanded to accommodate:						
*	- increased record size	___	___	___	___	___	
*	- increased data base size	___	___	___	___	___	
	- increased transaction load	___	___	___	___	___	
*	- increased number of terminals	___	___	___	___	___	
	- additional peripherals (e.g. printers)	___	___	___	___	___	
	- increased telecommunications traffic	___	___	___	___	___	
	- new data elements	___	___	___	___	___	
	d. System expansion can be easily accomplished via field upgrade	___	___	___	___	___	
	4. Maintenance						
*	a. System provides for easy data base maintenance	___	___	___	___	___	

BENCHMARKING CHECKLIST: RELIABILITY AND MAINTAINABILITY (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
*	b. System allows maintenance of index records	___	___	___	___	___	
	c. System provides for data file maintenance:						
	- at the record level	___	___	___	___	___	
	- at the field level	___	___	___	___	___	
*	- at the data element level	___	___	___	___	___	
	- at the character level	___	___	___	___	___	
*	- on-line	___	___	___	___	___	
	- batch mode	___	___	___	___	___	
	d. System provides workforms for entry and revision of system tables	___	___	___	___	___	
*	e. System vendor provides software maintenance:						
	- via on-line remote terminal	___	___	___	___	___	
	- on-site	___	___	___	___	___	
*	f. System vendor provides sofware enhancements on regular basis	___	___	___	___	___	
*	g. System vendor provides continuing improvements and enhancements	___	___	___	___	___	
*	h. Software enhancements easily installed	___	___	___	___	___	

BENCHMARKING CHECKLIST: RELIABILITY AND MAINTAINABILITY (CONTINUED)

	FUNCTION/FEATURE	SCORE					COMMENTS
		1	2	3	4	5	
*	i. System vendor provides consistent, scheduled, routine hardware maintenance	___	___	___	___	___	
*	j. System vendor performs emergency maintenance service promptly	___	___	___	___	___	

APPENDIX G

BENCHMARKING CHECKLIST: EASE OF USE AND MODIFICATION

This appendix contains the benchmarking checklist for assessing the "Ease of Use and Modification" of each system subjected to benchmarking. One set of checklists must be completed for <u>each</u> different system tested. Check only one score per feature. Indicate your score by placing a mark in the column corresponding to the score you feel most accurately describes the feature. Use the following scoring scale and corresponding criteria:

1 - No, the package does not offer the feature
2 - Yes, the package offers the feature but with severe limitations
3 - Yes, the package offers the feature with moderate limitations
4 - Yes, the package offers the feature with minor limitations
5 - Yes, the package offers the feature without limitations

Please make any additional comments in the space provided on the checklist. If there is not enough room for your comments, please use the reverse side of the checklist or attach a separate sheet of paper with the comments. Make clear reference to the function and feature you are commenting on by using the same numbering system or title used on the checklist.

As you perform your evaluations, pay particular attention to the features marked with " * " in the left-hand margin. These features are considered critical to the implementation of the system and deserve special attention during benchmarking.

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BENCHMARKING CHECKLIST: EASE OF USE AND MODIFICATION

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
1.	Help						
	a. System supports on-line assistance for users	___	___	___	___	___	
*	b. System permits user to set level of "help" desired	___	___	___	___	___	
	c. System provides informative messages in response to correctly executed transactions (may include audible tone)	___	___	___	___	___	
*	d. System provides comprehensive set of easily understood error messages when an error is made	___	___	___	___	___	
	e. System provides messages indicating both the occurence and nature of exceptional conditions	___	___	___	___	___	
	f. System provides comprehensive set of instructional messages to facilitate its use	___	___	___	___	___	
	g. Instructional messages accessible at point of need, without interruption of work in progress	___	___	___	___	___	

BENCHMARKING CHECKLIST: EASE OF USE AND MODIFICATION (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	h. Instructional messages or tracts on commands, requests, functions, errors, etc., available through use of "help" or similiar command	___	___	___	___	___	
2.	Documentation						
	a. Quick reference guide provided	___	___	___	___	___	
	b. User (functional) documentation provided for library staff	___	___	___	___	___	
	c. Documentation well indexed	___	___	___	___	___	
	d. Documentation includes ample illustrations and samples	___	___	___	___	___	
	e. Types of documentation provided:						
*	- system (application) documentation	___	___	___	___	___	
	- application environment documentation	___	___	___	___	___	
*	- data base documentation	___	___	___	___	___	
*	- data element dictionary	___	___	___	___	___	
*	- error messages and meanings	___	___	___	___	___	
*	f. System operator documentation provided:						
	- system installation	___	___	___	___	___	

BENCHMARKING CHECKLIST: EASE OF USE AND MODIFICATION (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	- system start-up	___	___	___	___	___	
	- data base creation	___	___	___	___	___	
	- data base back-up	___	___	___	___	___	
	- system shut-down	___	___	___	___	___	
	- batch operation	___	___	___	___	___	
	- recovery/restart	___	___	___	___	___	
*	g. System trouble-shooting documentation	___	___	___	___	___	
	h. System technical documentation:						
	- overview documentation	___	___	___	___	___	
	- operating system	___	___	___	___	___	
	- programming language	___	___	___	___	___	
	- telecommunication	___	___	___	___	___	
	- support software	___	___	___	___	___	
	- back-up, recovery and data verification software	___	___	___	___	___	
	i. Documentation maintained in machine-readable form	___	___	___	___	___	
*	j. Documentaion kept current by system vendor	___	___	___	___	___	
	k. Documentation of hardware and software (technical level) maintained in escrow by vendor for benefit of library customers	___	___	___	___	___	

BENCHMARKING CHECKLIST: EASE OF USE AND MODIFICATION (CONTINUED)

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
3. Defaults						
a. System supports default:						
- value for function selected (e.g. reference)	___	___	___	___	___	
- file to access (e.g. on-line catalog)	___	___	___	___	___	
- access control level (e.g. search only)	___	___	___	___	___	
- display format	___	___	___	___	___	
- values for various data elements in data entry, update and conversion	___	___	___	___	___	
- for number of overrides permitted per staff member per unit of time	___	___	___	___	___	
- limits on number of items retrieved at one time	___	___	___	___	___	
- limits on number and size of private files	___	___	___	___	___	
- limits on number of saved search expressions	___	___	___	___	___	
- other _____	___	___	___	___	___	
b. System cross-checks default values with newly entered data for validity	___	___	___	___	___	

BENCHMARKING CHECKLIST: EASE OF USE AND MODIFICATION (CONTINUED)

FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
c. System permits data carry-over from record to record for repetitive data entry	___	___	___	___	___	
d. Default values accessible on-line for inspection and modification by staff	___	___	___	___	___	
4. Overrides						
a. System supports override of automatic features:						
- automatic blocks	___	___	___	___	___	
- automatic routing (between locations)	___	___	___	___	___	
- private file use restrictions	___	___	___	___	___	
- material-type restrictions	___	___	___	___	___	
- patron-class restrictions	___	___	___	___	___	
- limits on various quantities	___	___	___	___	___	
- other _____	___	___	___	___	___	
b. System permits overrides of various delinquencies	___	___	___	___	___	
c. System supports overrides of hold queue placement	___	___	___	___	___	
d. System supports override of defaults or system table values	___	___	___	___	___	

BENCHMARKING CHECKLIST: EASE OF USE AND MODIFICATION (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	e. System controls overrides by level of access control via audit trail	___	___	___	___	___	
	f. System limits frequency and quantity of any override	___	___	___	___	___	
	g. System monitors and reports all override activity	___	___	___	___	___	
	5. Date and Time						
	a. System requires manual entry of date and time daily	___	___	___	___	___	
*	b. System maintains correct date and time continuously	___	___	___	___	___	
*	c. System supports perpetual calendar	___	___	___	___	___	
	d. System accomodates:						
	- library's hour of opening	___	___	___	___	___	
	- holidays	___	___	___	___	___	
	- proper control of date- and time-related functions	___	___	___	___	___	

BENCHMARKING CHECKLIST: EASE OF USE AND MODIFICATION (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
6.	General						
	a. System is basically command-driven:						
	- user must know commands to be used in each particular situation	___	___	___	___	___	
	- user prompted for command as circumstances dictate	___	___	___	___	___	
	b. System is largely menu-driven:						
	- menus displayed automatically as needed	___	___	___	___	___	
	- menus must be requested by user	___	___	___	___	___	
	- system prompts user action in particular cases	___	___	___	___	___	
*	c. Interaction with system requires logon	___	___	___	___	___	
*	d. Interaction with system requires user identification (session initiation) and password	___	___	___	___	___	
	e. Logon is simple and unambiguous	___	___	___	___	___	
	f. System logoff is straightforward	___	___	___	___	___	
	g. Sessions terminated by patron or by system (time-out)	___	___	___	___	___	

BENCHMARKING CHECKLIST: EASE OF USE AND MODIFICATION (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
	h. System automatically logs off terminal user when default time period has elapsed with no user activity	___	___	___	___	___	
	i. System requires user to identify needed function only when entry or modification of data is intended	___	___	___	___	___	
	j. Moving from function to function is:						
	- controlled by function keys on terminal	___	___	___	___	___	
	- controlled by function codes displayed on terminal screen	___	___	___	___	___	
	- controlled by user keyboard input	___	___	___	___	___	
	- controlled by barcoded or OCR function names	___	___	___	___	___	
	k. User/system dialog is well-defined, logical, easy-to-use	___	___	___	___	___	
	l. System supports published standards	___	___	___	___	___	
	m. System supports de facto standards	___	___	___	___	___	
*	n. System collects statistics on all facets of system operation and use to support report production and library management	___	___	___	___	___	

APPENDIX H

BENCHMARKING CHECKLIST: HARDWARE AND SOFTWARE FEATURES

This appendix contains the benchmarking checklist for evaluating the "Hardware and Software" features offered by each system subjected to benchmarking. One set of checklists must be completed for <u>each</u> different system tested. Check only one score per feature. Indicate your score by placing a mark in the column corresponding to the score you feel most accurately describes the feature. Use the following scoring scale and corresponding criteria:

1 - No, the package does not offer the feature
2 - Yes, the package offers the feature but with severe limitations
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5 - Yes, the package offers the feature without limitations

Please make any additional comments in the space provided on the checklist. If there is not enough room for your comments, please use the reverse side of the checklist or attach a separate sheet of paper with the comments. Make clear reference to the function and feature you are commenting on by using the same numbering system or title used on the checklist.

As you perform your evaluations, pay particular attention to the features marked with " * " in the left-hand margin. These features are considered critical to the implementation of the system and deserve special attention during benchmarking.

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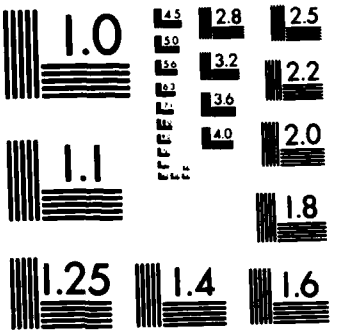
BENCHMARKING CHECKLIST: HARDWARE AND SOFTWARE FEATURES

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
1.	Software Portability						
*	a. Software easily accommodates varied library policies and practices (catalog configuration)	___	___	___	___	___	
*	b. Software usable on different computers:						
	- different models manufactured by the same vendor	___	___	___	___	___	
	- systems manufactured by different vendors	___	___	___	___	___	
	c. Software upward compatible on different models of same computer	___	___	___	___	___	
	d. System physically portable	___	___	___	___	___	
*	e. System accommodates multiple data bases	___	___	___	___	___	
*	f. Software accomdates various data file sizes:						
	- fewer than 100,000 characters	___	___	___	___	___	
	- 100,000 to 5 million characters	___	___	___	___	___	

BENCHMARKING CHECKLIST: HARDWARE AND SOFTWARE FEATURES (CONTINUED)

FUNCTION/FEATURE	SCORE					COMMENTS
	1	2	3	4	5	
- 5 million to 50 million characters	___	___	___	___	___	
- 50 million to 500 million characters	___	___	___	___	___	
- more than 500 million characters	___	___	___	___	___	
- more than 5 trillion characters	___	___	___	___	___	
2. Terminal Display Features						
a. System provides terminal displays in multiple colors and intensities	___	___	___	___	___	
b. System makes use of reverse imaging or other special terminal display features	___	___	___	___	___	
3. System Characteristics						
a. System supports multiple users (simultaneously)	___	___	___	___	___	
b. System supports intelligent terminals	___	___	___	___	___	
* c. System supports workstation printers	___	___	___	___	___	

AD-A154 349 LOCAL AUTOMATION MODEL SOFTWARE BENCHMARKING: TEST PLAN 2/2
(U) LOGISTICS MANAGEMENT INST BETHESDA MD
R W HARTT ET AL. MAR 85 LMI-DL401 DTIC-TR-85/3
UNCLASSIFIED MDA903-81-C-0166 F/G 5/2 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

BENCHMARKING CHECKLIST: HARDWARE AND SOFTWARE FEATURES (CONTINUED)

	FUNCTION/FEATURE	SCORE 1	2	3	4	5	COMMENTS
4.	Work Tracking						
*	a. System logs users' transactions for each session	___	___	___	___	___	
*	b. System identifies session by input of user identification number	___	___	___	___	___	

APPENDIX I

DTIC TR DATA BASE DATA ELEMENTS

This appendix contains a brief description of the data elements extracted from the Defense Technical Information Center (DTIC) Technical Reports (TR) data base. Citations from the TR data base were selected for use in a test data base available during benchmarking. Citations selected for the extract are unclassified and have unlimited distribution.

DTIC TR DATA BASE DATA ELEMENTS

DTIC Elem. No.	Element Name	Number of Occurr.	Description/Comments
1	AD Number	1	AD numbers assigned before 1 Jan 75 consist of six numeric characters AD numbers assigned after 1 Jan 75 consist of one alphabetic and six numeric characters
2	COSATI Field/Group	1 to 8	An unlimited number of fields/groups can be assigned to a document
3	Constant		
4	NTIS Document Prices		Example: [NTIS P]rices[: HC$]3.00 [MF$]0.95
5	Coprorate Source	1 to 8	Name of the originating agency of the document
6	Unclassified Title	1	
7	Classified Title*	1	This field will be blank for all records
8	Title Classification	1	All records will have a value of "(U)" -- Unclassified
9	Descriptive Note/Scope Notes	1	A phrase that denotes the type o of report, such as "Final", "Annual" or "Research Note"
10	Personal Author	1 to 5	May contain up to five authors separated by a delimiter. Names will appear as Last name-comma-first name or initial-space-middle name or initial.
11	Report Date/Origination Date	1	Date that the document was prepared by the originator, given as YYMMDD
12	Pagination	1	Left justified, zeroes suppressed
13	Journal Announcement Code		Indicates which TAB or Government Announcement announced this document

DTIC TR DATA BASE DATA ELEMENTS (CONTINUED)

DTIC Elem. No.	Element Name	Number of Occurr.	Description/Comments
14	Originating Agency Report Numbers/Source Series and Report Number	1 or more	The series number of the originating agency as it appears on the title page of the document
15	Contract Number or Grant Number	1 or more	
16	RDT&E Project Number	1 or 2	
17	RDT&E Task Number	1 or 2	
18/19	Monitor Acronym/Series	1 or 2	Identifies the government agency sponsoring the work
20	Report Classification	1	All test records have a value of "U".
21	Supplementary Note	1	Inofrmation about the document for which no space was provided.
22	Alpha Limitations	1	Indicates the distribution and availability of this document.
23	Asterisked Descriptors/ Unasterisked Descriptors	1 to 20	The key subject posting terms that have been selected to indicate the content of the document are recorded in this field. Key descriptors are preceded by an asterisk.
24	Descriptor Classification	1 to 20	All test records have a value of "U".
25	Identifier Set/Open-ended Terms	1 to 20	Additional words and phrases to describe the content of the document
26	Identifier Classification	1 to 20	All test records have a value of "U".
27	Abstract	1	
28	Abstract Classification	1	All test records have a value of "U".
29	Initial Inventory	1	Identifies the original number of copies from the contributor

DTIC TR DATA BASE DATA ELEMENTS (CONTINUED)

DTIC Elem. No.	Element Name	Number of Occurr.	Description/Comments
30	Annotation	1	Contains a concise paragraph on the contents of the document
31	Special Indicator	1	
32	Regrade Category/ Reclassification Code*		
33	Distribution Availability Codes*		
34	Serial Code/Source Series	1	
35	Source Code/Corporate Author Code	1	
36	Document Location	1	
37	Classification Authority/ Classified by*		
38	Declassification Date*		
39	Downgrade Date*		
45	Extended by*		
46	Review on*		
47	Reason Code/Reason for Extension*		

* Because all test data are unclassified and unrestricted, asterisked test fields are blank.

Note: In fields with more than 1 occurrence, values are separated by a comma, blank, and delimiter.

APPENDIX J

DNA ATLAS FILE DATA ELEMENTS

This appendix contains a brief description of the data elements extracted from the Defense Nuclear Agency (DNA) Automated Technical Library Accession System (ATLAS). The data elements extracted from ATLAS are used to establish a test data base for benchmarking.

DNA ATLAS FILE DATA ELEMENTS

Elem. No.	Element Name	Element Abbr.	Number of Occurr.	Description/Comments
1	DTL Number	DTL-NO	1	
2	Filler	FILLER	1	
3	Status Code	STATCD	1	Indicates status of holding: shelved, on loan, missing, etc.
4	Date Coded	DATECD	1	Date holding was input into system
5	Primary Report Number	PRI-RPT	1	
6	Secondary Report Number	SEC-RPT	1	
7	DTIC AD Number	DOC-AD-NO	1	Includes 2 subfields: 7 char. AD Number and 5 char. AD Number
8	MIPR Number	DASA-MIPR	1	
9	Origination Date	ORG-DT	1	
10	Originating Agency	ORG-AG	1	
11	Security Control Number	S-CTL-N	1	
	Holding/Classification:	H-CLASS		
12	- CNWDI	CNWDI	1	
13	- Handling	HD	1	
14	- Restricted Data	RDI	1	
15	- Document Classification	CLASS	1	
16	- Downgrade Date	DOWNG	1	
17	Leaf Count	PG-LF	1	
18	Contract Number	CONTRACT-NO	1	
	Weeds:	WEEDS		
19	- Category	CATEG	1	
20	- Retention Cycle	R-CYL	1	
21	- Office Symbol	O-SYM	1	
22	Scope Notes	SCOPE NOTES	1	
23	Subtask	SUBTASK	1	
24	Copy Number/Series Number	CS-1 to CS-4	1 to 4	

DNA ATLAS FILE DATA ELEMENTS (CONTINUED)

Elem. No.	Element Name	Element Abbr.	Number of Occurr.	Description/Comments
25	Copy/Series Deletion Date	CS1-DT to CS4-DT	1 to 4	
26	Microfiche Copy Number	MF-1 to MF-4	1 to 4	
27	Microfiche Deletion Date	MF1-DT to MF4-DT	1 to 4	
28	Author	AUTHOR-1 to AUTHOR-4	1 to 3	
29	Title	TITLE-1 to TITLE-4	1 to 4	
30	Deletion Message	DELE-MESS	1	

END

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DTIC